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COURSE OUTLINE FOR AGRICULTURAL MACHINERY--SERVICE OCCUPATIONS.

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THE OBJECTIVE OF THE 16-MODULE COURSE OUTLINED IN THIS GUIDE IS TO HELP TEACHERS PREPARE FORMER FARMERS, HIGH SCHOOL DROPOUTS AND GRADUATES, AND UNEMPLOYED, AND EMPLOYED PERSONS FOR OCCUPATIONAL ENTRY AS AGRICULTURAL MACHINERY SETUP MEN, MECHANIC'S HELPERS, MECHANICS, PARTS MEN, AND SERVICE SUPERVISORS. IT WAS DEVELOPED BY A NATIONAL TASK FORCE ON THE BASIS OF RESEARCH FROM STATE STUDIES. THE SELF-CONTAINED, NONSEQUENTIAL UNITS OR MODULES ARE (1) DEALERSHIP MANAGEMENT AND ORGANIZATION, (2) SERVICE DEPARTMENT OPERATING PROCEDURES, (3) PARTS DEPARTMENT PROCEDURES, (4) SALESMANSHIP, (5) HUMAN RELATIONS, (6) METAL FUSION, (7) LUBRICATION, (8) MECHANICAL POWER TRANSFER SYSTEMS, (9) HYDRAULIC POWER TRANSFER SYSTEMS, (10) TILLAGE, PLANTING, SPRAYING, AND FERTILIZING MACHINERY, (11) CROP HARVESTING MACHINERY, (12) SMALL GASOLINE ENGINES, (13) TRACTOR TUNEUP AND MAINTENANCE, (14) GASOLINE TRACTOR ENGINE SYSTEMS, (15) DIESEL ENGINE SYSTEMS, AND (16) TRACTOR REPAIR. THE GUIDE SUGGESTS (1) TIME ALLOTMENTS, (2) SUPPLEMENTARY COURSES TO CORRECT DEFICIENCIES IN MATHEMATICS, COMMUNICATIONS, AND READING COMPREHENSION, (3) COURSE MATERIALS TO ADAPT THEM TO THE NEEDS OF ENROLLEES, (4) OCCUPATIONAL EXPERIENCES, (5) CRITERIA FOR ENROLLEE SELECTION, (6) CRITERIA FOR COURSE EVALUATION, (7) TOOLS AND EQUIPMENT, AND (8) REFERENCES. TEACHERS OF THE COURSE SHOULD HAVE EXPERIENCE WITH AGRICULTURAL MACHINERY. STUDENTS SHOULD HAVE MECHANICAL APTITUDE, A HIGH SCHOOL BACKGROUND, AND AN OCCUPATIONAL GOAL IN AGRICULTURAL MACHINERY. THIS DOCUMENT IS ALSO AVAILABLE FOR A LIMITED PERIOD AS PART OF A SET (VT 000 488 THROUGH VT 000 504) FROM THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, THE OHIO STATE UNIVERSITY, 980 KINNEAR ROAD, COLUMBUS, OHIO 43212, FOR $7.50 PER SET. (JM)

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COURSE OUTLINE

FOR

AGRICULTURAL MACHINERY— SERVICE OCCUPATIONS

The Center for Research and Leadership Development

in Vocational and Technical Education

The Ohio State University
980 Kinnear Road
Columbus, Ohio, 43212

The development of these materials was supported by a grant
from the
Division of Adult and Vocational Research
United States Office of Education

August, 1965

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MEMORANDUM

TO: The ERIC Clearinghouse on Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

FROM: (Person) James W. Hensel (Agency) The Center for Vocational and Technical Education

(Address) 980 Kinnear Road, Columbus, Ohio 43212

DATE: August 4, 1967

RE: (Author, Title, Publisher, Date) The Center for Vocational and Technical Education, "Course Outline for Agricultural Machinery--Service Occupations," August, 1965

Supplementary Information on Instructional Material

Provide information below which is not included in the publication. Mark N/A in each blank for which information is not available or not applicable. Mark P when information is included in the publication. See reverse side for further instructions.

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Level of Group National
Method of Design, Testing, and Trial Part of a funded project of the USOE, OE-5-85-009; materials based on research from state studies; see preface material in the course outline.

(3) Utilization of Material:
Appropriate School Setting Post high school
Type of Program General post high school class in agricultural machinery
Occupational Focus Agricultural machinery service occupations
Geographic Adaptability Nationwide
Uses of Material Instructor course planning
Users of Material Teachers

(4) Requirements for Using Material:
Teacher Competency Background in agricultural machinery
Student Selection Criteria Post high school, mechanical aptitude, high school background, goal in agricultural machinery service occupation.
Time Allotment Estimated time listed in module. (P)

Supplemental Media --
Necessary x
Desirable
(Check Which)

Describe Suggested references given in module. (P)

Source (agency)
(address)

Content of a Course for
Several Levels of Employment in

AGRICULTURAL MACHINERY--SERVICE OCCUPATIONS

Teaching Modules Making Up This Course

Note: It is not implied that the sequence in which the modules are presented below is the order in which they are to be taught.

1. Organization and Management of Agricultural Machinery Dealerships
2. Agricultural Machinery Service Department Operating Procedures
3. Agricultural Machinery Parts Department Operating Procedures
4. Agricultural Salesmanship
5. Human Relations in Agricultural Occupations
6. Metal Fusion and Fabrication Welding
7. Agricultural Machinery Assembly and Lubrication
8. Mechanical Power Transfer Systems
9. Hydraulic Power Transfer Systems
10. Adjustment, Maintenance, and Repair of Tillage, Planting, Spraying, and Fertilizing Machinery
11. Adjustment, Maintenance, and Repair of Crop Harvesting Machinery
12. Adjustment, Maintenance, and Repair of Small Gasoline Engines
13. Tractor Tune-up and Maintenance
14. Gasoline Tractor Engine Systems
15. Diesel Engine Systems
16. Tractor Repair

Publications on Off-Farm Agricultural Occupations
Available From
The Center for Research and Leadership Development
in Vocational and Technical Education
The Ohio State University
980 Kinnear Road
Columbus, Ohio, 43212

This publication is one of a series relating to Off-Farm Agricultural Occupations developed at The Center for Vocational and Technical Education under a grant from the Division of Adult and Vocational Research, U. S. Office of Education. Each of these publications was designed for a specific purpose. However, they are designed to complement and reinforce each other. It is suggested that persons using any of these materials will want to familiarize themselves with the other publications in this series. Following is a complete listing of this series.

1. Policy and Administrative Decisions in Introducing Vocational and Technical Education in Agriculture for Off-Farm Occupations

2. Vocational and Technical Education in Agriculture for Off-Farm Occupations

3. Summary of Research Findings in Off-Farm Agricultural Occupations

4. Planning and Conducting Cooperative Occupational Experience for Off-Farm Agriculture

5. Occupational Guidance for Off-Farm Agriculture

6. Horticulture - Service Occupations
(Course outline and twelve modules)

7. Agricultural Supply - Sales and Service Occupations
(Course outline and twelve modules)

8. Agricultural Machinery - Service Occupations
(Course outline and sixteen modules)

9. Agricultural Chemical Technology
(Course outline and nine modules)

PREFACE

This publication is one of a series developed by a national task force at The Center for Vocational and Technical Education to assist state and local vocational education leaders in developing programs to prepare youth and adults for employment and/or advancement in off-farm agricultural occupations.

This project had its origins in the National Research Coordination Conferences on Off-Farm Agricultural Occupations sponsored by The National Center for Advanced Study and Research in Agricultural Education and the Agricultural Education Branch of the U. S. Office of Education in May of 1963 and January of 1964. These conferences were designed to assist states in undertaking studies of off-farm agricultural occupations training needs.

Subsequently, the Center was given a grant by the Bureau of Adult and Vocational Research to synthesize these studies, develop needed instructional and program materials, and conduct training conferences on their use.

The task force of 30 people from 16 states has included personnel with a wide range of backgrounds and responsibilities in agricultural education, vocational education, agricultural technology, and agricultural industry. Several project advisory meetings were held to secure needed counsel from diverse, but relevant groups and to help the task force maximize the potential benefits and uses of these materials.

Primary leadership for the development of this publication was provided by Mr. Alan Kahler. Assisting him on the project were Mr. V. B. Hairr, Mr. Earl Scott, and Mr. Martin Rehmert.

In developing these instructional materials, prime consideration was given to the data revealed by the studies of agricultural business and employee training needs conducted in several states. Current and projected employment opportunities dictated the areas in which instructional materials were developed. In addition, these studies identified those occupations which require knowledge and skill in agriculture. They also contributed to the development of the publication series through the identification of specific competencies needed by individuals for entry and persistence in agricultural occupations.

Members of the task force were aided in the development of these publications through personal visitations to outstanding existing off-farm agricultural occupational programs. Frequent consultations with trade association educational committees and agricultural industry leaders concerned with personnel development were helpful

in further "keying" these materials to employment needs. Existing materials were carefully reviewed and evaluated in terms of their utility in the preparation of these workers and, when suitable, were recommended as a part of these publications. References are also made to other instructional materials and sources designed to aid teachers and supplement and reinforce project materials.

Following the first draft of each publication by the Center, copies were sent to a wide range of knowledgeable individuals for review and evaluation. Reviewers included experienced teachers in vocational agriculture and other vocational services, college and university specialists in the appropriate subject-matter area, supervisory and research personnel, and agricultural business and industrial leaders. Many of their comments and suggestions were incorporated into the revision. However, the final responsibility for the content rests with the project staff.

It should be recognized that these materials are still developmental in nature. Although considerable time and effort have been expended to bring them to this stage of development, it is recognized that they are not the final answer in planning and conducting off-farm agricultural education programs. We hope that the experiences gained through the utilization of these materials during the coming year will assist us in their further refinement.

Your attention is directed to the evaluation form which accompanies each module. Persons using these materials are asked to complete the form and return it to the Center. We believe these evaluations, based on actual experiences, will provide a valuable basis for further improvement and will help identify voids in existing materials.

ROBERT E. TAYLOR
Director
The Center for Research and
Leadership Development in
Vocational and Technical Education

Introduction

Programs in vocational agriculture are being expanded and new programs are being developed at the post-high school level throughout the nation, to train persons for occupational entry and advancement in the agricultural machinery service occupations. Research indicates that many occupational opportunities exist in the agricultural machinery industry. According to the 1965 Farm Fact Book, the average farm size has increased in all states. The size of the commercial farm will probably continue to increase. As commercial farms become larger and their methods of production more technical in nature, they will require a wider variety of services from agricultural machinery dealerships in order to function efficiently. The need for competent employees in the agricultural machinery industry is further exemplified by the interest which has developed on the part of employers in hiring competent people to fill positions in the service occupations in their dealerships.

The Vocational Education Act of 1963 has made it possible to establish programs for preparing personnel for jobs in the agricultural machinery service occupations. In order to prepare workers to assume these positions in the local agricultural machinery dealership requiring knowledge and skill in agriculture, it is necessary to have programs established to provide the appropriate classroom, laboratory, and occupational experience to develop the competencies workers need to be successful on the job. Herein lies the opportunity and challenge for those entrusted with programs at the high school and post-high school levels to prepare service workers for jobs in agricultural machinery dealerships.

The materials presented in this area were developed to aid teachers who are offering programs for employees of agricultural machinery businesses. These materials should be considered developmental in nature and persons who use them should integrate them carefully into a well-planned program supplementing them with other appropriate materials.

Enclosed with these materials are evaluation forms which will be used to guide the improvement of future publications. Please fill out an evaluation form following completion of each module. This will assist in a systematic evaluation of materials developed at The Center.

AGRICULTURAL MACHINERY--SERVICE OCCUPATIONS

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AGRICULTURAL MACHINERY--SERVICE OCCUPATIONS

Purpose of Course

To develop the competence needed at the post-high school level for occupational entry and advancement in service occupations in agricultural machinery dealerships.

Occupations or Levels of Employment for Which Course Is Intended

Agricultural machinery set-up man
Agricultural machinery mechanic's helper
Agricultural machinery mechanic
Agricultural machinery parts man
Agricultural machinery service supervisor

Suggested Time Allotments

(See Table on Page 4 and time suggestions for each module.)

Persons to be Served

1. Farmers who have left the farm seeking employment elsewhere

2. High school graduates desiring employment in the agricultural machinery service occupations who did not receive training for these occupations in high school

3. High school graduates who need a higher degree of competence for occupational entry into these occupations

4. High school dropouts who are capable of mastering the skills, abilities, and understanding necessary for occupational entry in the agricultural machinery service occupations and who show an earnest desire for such employment

5. Unemployed persons capable of carrying out the responsibilities of these jobs and who show an earnest desire for occupational entry in the service occupations in agricultural machinery dealerships

6. Persons presently engaged in these occupations desiring to update their understandings, skills, and abilities

Supporting Education Needed

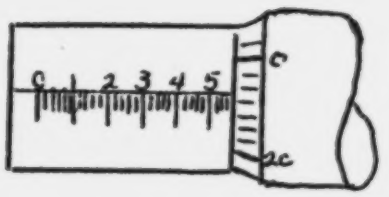
Due to the difference in the educational backgrounds of the people for whom this course is intended, probably no specific course should be required before a person is allowed to enroll in the course. Desire for occupational entry and potential ability for carrying out the functions of

these occupations should be considered the prerequisites for enrolling in the course. Most students will likely be deficient in mathematics, communications, and reading comprehension. Instruction that will correct these deficiencies should be offered concurrently with instruction in the modules making up the course in agricultural machinery. Care should be exercised to make certain that these courses develop those abilities, skills, and understandings needed by agricultural machinery service employees.

The mathematics instruction course should include the use of fractions, decimals, ratios, areas, percentages, measurements, etc. Instruction should be centered around situations that an agricultural machinery service employer will confront in his job. The following problems illustrate the proper approach to teaching mathematics to support this course.

1. The diameter of the two pulleys connected by a belt are, respectively, 15 and 8 inches. The smaller pulley makes 600 r.p.m. How many r.p.m. is the larger pulley turning?

2. A mechanic overhauling an engine checked a shaft for wear. Using a micrometer observe the following setting on the micrometer of ten measuring the shaft. What was the thickness of the shaft?



The instruction in communications should include study of proper use of forms used by the agricultural machinery dealer, conversational speech, letter writing, describing part failures on machines, etc.

The specific supporting competencies to be taught concurrently with the modules will be dictated by the deficiencies of the group enrolled in the course.

Suggestions for Introducing the Course

At the first class meeting the instructor should give the enrollees a broad overview of the course and develop enthusiasm on the part of the enrollee for the course. The instructor should discuss with the enrollees the following items during this meeting.

1. Why the course is needed
2. What the course is to do
3. The major areas to be dealt with in the course
4. How the course will benefit the enrollee and why the major course areas are important in the course

5. How the teaching will be done -- the class schedule, the occupational experiences to be provided at the school and on the job
6. The role of the classroom instructor
7. What is expected of the student
8. What level of occupations and the level of employment that the course may lead to through proper study, training, and application
9. Job possibilities upon completion of the course

It is important that all these points be made clear to the enrollees, and that they accept them as being important. Opportunities for enrollees to discuss these points and to ask questions are essential. The idea of cooperation and working together should be emphasized at the first class meeting. It is usually good to get into the course itself during the first class period. The extent of this work may be limited, but the important thing is to begin--and to make an effective beginning!

Modules Needed in Each Occupation or Level of Employment
and
"At School" Time Allotments*

Teaching Modules:	Agricultural Machinery Set-up Man	Agricultural Machinery Mechanic's Helper	Agricultural Machinery Mechanic	Agricultural Machinery Service Department Manager	Agricultural Machinery Parts Man
1. Organization and Management of Agricultural Machinery Dealerships	18	18	18	18	18
2. Agricultural Machinery Service Department Operating Procedures	66	66	66	66	66
3. Agricultural Machinery Parts Department Operating Procedures					54
4. Agricultural Salesmanship	30	30	30	30	30
5. Human Relations in Agricultural Occupations	24	24	24	24	24
6. Metal Fusion and Fabrication Welding		48	48	48	
7. Agricultural Machinery Assembly and Lubrication	138				
8. Mechanical Power Transfer Systems			60	60	60
9. Hydraulic Power Transfer Systems			210	210	210
10. Adjustment, Maintenance and Repair of Tillage Planting, Spraying and Fertilizing Machinery		282	282	282	282
11. Adjustment, Maintenance, and Repair of Crop Harvesting Machinery		198	198	198	198
12. Adjustment, Maintenance, and Repair of Small Gasoline Engines		108	108	108	
13. Tractor Tune-up and Maintenance		72	72	72	72
14. Gasoline Tractor Engine Systems			42	42	42
15. Diesel Engine Systems			36	36	36
16. Tractor Repair			504	504	
TOTAL "At School" Time	276	846	1698	1698	1092

*Time is stated in clock hours.

Nature of the Course

This course is a vocational technical education program in that it is specialized education for work in a particular non-professional occupation or cluster of occupations. The course is designed for use in junior or community colleges, vocational schools, technical institutes, and branches of universities serving areas usually larger than local school districts. The area school program is discussed in detail in the publications entitled,"Vocational and Technical Education in Agriculture for Off-Farm Occupations," and "Policy and Administrative Decisions in Introducing Vocational and Technical Education in Agriculture for Off-Farm Occupations."

The course is designed to develop the degree of competency needed for initial employment in the various service occupations in agricultural machinery dealerships. The course is not intended to develop the degree of competence needed by the highly skilled employee in any of the service occupations. Further training in special schools conducted by the agricultural machinery companies for which the enrollee is employed may be necessary to develop higher degrees of skill.

The course is so designed that part of the preparation for these occupations can be carried out in the high-school vocational agriculture program. The high-school vocational agriculture program can provide adequate training for gainful employment at the set-up man and mechanic's helper levels of employment. Training for occupational entry as a parts man, mechanic and service department manager should be provided at the post-high school level in area vocational schools. If part of the instruction is provided at the high-school level and part in the area school, the two programs should be coordinated to provide the best possible total educational program, thus eliminating waste and frustration. In addition to preparing set-up men and mechanics' helpers, the high-school vocational agriculture program can provide instruction in production agriculture and mechanics basic to all the agricultural machinery service occupations.

Two approaches should be considered in providing this training in the area school; and if it is necessary, both may be taken at the same time. First, instruction can be provided daily for those who are able to attend classes daily. Second, classes could be scheduled in the evening for those who are employed during the day at other jobs. These persons desire to prepare themselves for occupational entry in new occupations. Those presently employed in these occupations who desire to update their skills and abilities may attend night classes. The approach used in the area school will be dictated by the needs of the group the course is to serve. It is important for those who administer the course to realize that the responsibility of the area school is to provide educational opportunities for persons 16 years of age to 60 years of age, and that their programs should satisfy the needs of people of all ages with all types of educational backgrounds.

Use of the Course Materials

This course is made up of sixteen modules. Each module is a complete, self-contained part of the course that may or may not be taught in the sequence given in the course outline. Not all modules may be needed to meet the needs of the students to be taught. The experience and educational background of the students will dictate the modules that should be included in the course.

Each module consists of (1) a major teaching objective, (2) a suggested time allotment for school instruction and occupational experience, (3) an introduction to the module, (4) the competencies to be developed, (5) suggested instructional materials and references for use in teaching the module, and (6) suggestions for evaluating the educational outcomes of the module.

For each competency four kinds of information is included: (1) subject matter content, (2) suggested instructional materials and references, (3) suggested occupational experience needed to develop each competency, and (4) suggested teaching-learning activities.

The subject matter content provides an overall view of the important aspects of each competency that should be stressed by the teacher. It may include charts, tables, graphs, drawings, etc. The content may be in topical outline or paragraph form. The subject matter content as included in each competency is not complete enough for all lesson preparation. The teacher must use the references at the end of each competency and other references to supply the additional information that he needs to teach.

Under the section entitled "Suggested Instructional Materials and References," are listed materials that may be used by the instructor in developing the competency. These are suggestions, and should help the instructor identify other materials and references that could be used in teaching.

Specific activities that may help the teacher to develop the competence of his students are listed under "Suggested Teaching-Learning Activities." In the main, these activities emphasize student involvement in carrying out the activity. Since new materials are continually becoming available, the instructor should supplement each list with new strip films, movies, etc., that he is familiar with which will improve his instruction. In the modules emphasizing machinery and tractor adjustment, maintenance, and repair, the teaching-learning activities provide the basic instruction needed to develop the competence of the student. Care should be exercised, however, to avoid making the course a classroom teacher-centered learning situation.

Under suggested occupational experience, activities are identified that should be carried out on-the-job at the agricultural machinery dealership. These will further implement or put the final touches on

the development of the competency. These activities are just as important to effective teaching as is the subject matter content and the teaching-learning activities. Care should be exercised to make certain that there is a high correlation between what is being taught in the classroom and shop and the learning activities of the student at the agricultural machinery dealership.

Adapting the Course to the Needs of the Enrollee

Due to the difference in the educational background, age, and experiences of the people for whom the course is intended, the course pursued by the enrollees will vary. The course will need to be more basic in nature for the individual that may not have completed high school. For those who are presently employed in agricultural machinery service occupations who desire to update their skills and abilities, the course would be more specialized in nature. It will be necessary for the person setting up the course to group the enrollees according to their instructional needs, determine the content of the course needed by the enrollees, and set up a program to fit these needs. The modular concept upon which this course has been developed provides this flexibility.

Courses should be scheduled so as to make the most efficient use of teacher time and school facilities and yet provide the level of instruction to which the student is entitled. Using the modular concept, this can readily be accomplished. Students planning on occupational entry in several different occupations could be brought together and taught at the same time. For example, students training to be mechanics and set-up men could be taught agricultural machinery salesmanship at the same time. Students of other courses could also be included in this class. When necessary, the trainees may be divided into separate classes for more specific training.

Cooperating with Representatives of Industry

It is imperative that local industry representatives be involved in the organization and implementation of this program. These people when formed into and used as an advisory council can provide valuable assistance in advising on course content, equipment needed in the instructional program, training stations for the enrollees, and help in the placement of enrollees after completing the course. Relationships should be established with the agricultural machinery dealers' association, and where possible, with major-line company officials. These relationships will help the instructor place the enrollees at the time of graduation.

Providing Supervised Occupational Experience

Supervised occupational experience is an integral part of this course. Experience gained while on the job cannot be duplicated in the

classroom or the school shop. The occupational experience program should if at all possible, be carried on at the time the student is attending classes. The classroom instruction should be supplemented on the job. In the event that occupational experience cannot be provided concurrently with the class instruction, other provisions should be made to provide this experience. If this approach is used, experience to be provided on the job should be highly correlated with the classroom instruction. If the occupational experience is to be provided during the summer months, extreme care should be exercised to avoid making the program merely a summer work program that is aimed only at helping the agricultural machinery dealer out during his busy season.

Careful attention should be given to the selection of training centers that are to provide these experiences. They should be agricultural machinery dealerships that can provide an atmosphere condusive to learning and that will create a strong desire in the student to become a part of the agricultural machinery industry. The manager of the dealership must be sympathetic to the program and provide capable and responsible employees to work with the trainee. It may be necessary for the instructor to educate the managers of the training centers to the objectives of the program, and their responsibilities in providing the best possible training program for the trainee. Providing supervised occupational experience for off-farm occupations in agriculture is discussed in detail in the publication entitled, "Planning and Conducting Cooperative Occupational Experience in Off-Farm Agriculture," available from the Center for Vocational and Technical Education.

Providing Competent Instructors

Due to the technical nature of the content included in this course, teachers and area school administrators may need to solicit the help of industry people to teach part of the course. Only individuals who are considered highly competent as mechanics, parts men, or service department managers should be selected to fill these positions. It should be realized, however, that these people will not be proficient in the method of teaching. Having little or no training in this area, they will need a great deal of help as they teach. If possible, they should be trained in the method of teaching prior to their beginning to teach. However, if this is impossible, they should be given short-course instruction in the method of classroom teaching as they teach the course, and should work closely with a qualified teacher to develop this skills in this area.

Selection of Enrollees

Applicants for the course should be highly screened to make sure that the right people are enrolled. Desire for occupational entry and potential ability for carrying out the functions of these occupations should be considered when screening applicants. A battery of tests

should be administered to each applicant and should be analyzed by a person competent in this field. Included in this battery of tests should be interest inventories, aptitude tests, and achievement tests. When an individual is analyzed in this manner, a clearer picture of the whole individual will emerge, and a decision concerning his potential ability and interests can be made more wisely. Data received through the battery of tests should be combined with information received through personal interview and from those who are well acquainted with the individual. Selection of the individuals should be based on this information.

The Setting for the Development of the Course

It was a growing awareness of the urgent need for more definite information on the requirements for occupational education involving competencies in agriculture that brought state leaders in agricultural education and representatives from the United States Office of Education together at planning conferences at the then National Center for Advanced Study and Research in Agricultural Education at The Ohio State University in May, 1963, and January, 1964. At these planning conferences, procedures were outline for use in investigating off-farm occupations in agriculture. In January and April, 1965, advisory conferences were held at the National Center to preview preliminary research reports. As a result, the Center was urged to develop curriculum guides and course materials that would implement these findings. Due to the magnitude and variety of occupations found to involve competencies in agriculture, it was recommended that the National Center prepare course materials in four areas; namely, ornamental horticulture at the high-school level, agricultural supply--sales and service at the high school and post-high school level; agricultural mechanization at the post-high school level; and agricultural chemicals at the technician level.

As a result of the action of these conferences and the receipt of a grant from the Division of Adult and Vocational Research of the U.S. Office of Education, selected persons were brought to the Center to develop program guides and course materials in the areas identified.

The selection of the areas in which to develop course materials, the occupations for which the courses were to be developed, and the content of the courses and the modules were determined by the research reported to the Center by the states. In the agricultural mechanization area, studies revealed that the largest number of employment opportunities, as well as those presently employed, were in the agricultural machinery industry. Findings further revealed that in this industry over 50 per cent of the opportunities for employment and the number presently employed are in the service occupations. Data presented on the following page are typical of the findings of the states concerning the employment opportunities in the agricultural machinery industry.

Level of Employment	IOWA (Statewide) Presently Employed	Increase in Five Years	OKLAHOMA (Statewide) Presently Employed	Increase in Five Years
Managers	1,064	139	363	31
Department Managers	244	53	35	22
Sales	745	170	202	167
Clerical	632	70	72	19
Service	3,574	518	1,233	887
Total	6,260	959	1,905	1,125

After reviewing the data, it was decided by the staff members at the Center that the most logical selection of an area in which to develop course materials in the agricultural mechanization area was in the agricultural machinery service occupations.

The studies reported to the Center by the states were again the bases to identify the competencies that persons employed in the agricultural machinery service occupations needed in order to effectively perform their jobs. The state studies also helped identify the degree of proficiency needed in the competencies for initial employment. A summary of their findings are presented in the publication entitled, "Summary of Research Findings in Off-Farm Agricultural Occupations," available from the Center for Vocational and Technical Education.

Involvement from Industry and Agricultural Educators in the Development of the Course

Throughout the development of the course, personnel from the agricultural machinery industry were consulted for advice and suggestions as to content for the course (and modules), the time that should be spent in each module, and ways of implementing the needed instruction. The persons consulted included parts men and mechanics employed in agricultural machinery dealerships, agricultural machinery dealership managers, branch house representatives and major-line agricultural machinery company officials.

As each module was developed, it was submitted to industry representatives for preliminary evaluation. The suggestions made by these people were incorporated into the modules. The modules were then submitted to selected people who are recognized authorities in the field of agricultural machinery for a final review. Among these people were

agricultural engineers; agricultural educators; agricultural machinery parts men and mechanics at the local, district, and national levels; agricultural machinery dealership managers; instructors in area schools; and others who were capable of rendering a critical evaluation of the modules.

The following list of persons evaluated selected modules of the course materials within their area of specialization. Their comments and constructive criticisms aided materially in strengthening the value of these materials. However, the final responsibility for the course rests with personnel at the Center who developed these materials.

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Suggestions for Evaluating the Course

The following criteria should be used in evaluating the effectiveness of the course.

1. Number of enrollees completing the course who have been employed in the agricultural machinery service occupations for which they were trained

2. Number of persons employed in the service occupations a year or more after completion of the course

3. Acceptance of the course by present and future employers

4. Employer evaluations of the quality of work done by employees who have completed the course

5. Number of students who are continuing their training after employment

6. Reaction of enrollees toward the course of study

7. Enrollment trends in the course
8. Reasons given by enrollees who terminated their employment
9. Ability to place students after completing the course
10. Number of former students who have advanced to a higher level of employment
11. Social mobility of the enrollee after completion of the course
12. Parental evaluation of the course
13. School administration of the course

Suggested Instructional Materials and References for the Course

1. "A Day to Remember," 16mm film, 28 minutes. Available from the John Deere District Branch Houses.
2. "A Step Ahead--In Careers in Agriculture," 16mm film, 14 minutes. Your Local New Holland Machinery dealer.
3. "Arc Welding at Work," 16mm film. General Electric Company, Schenectady, New York. Free.
4. "Arc Welding Electrode Selection," 16mm film, 20 minutes. Hobart Technical School, Troy, Ohio. Free.
5. "Ball Bearing Maintenance." New Departure, Division of General Motors, Bristol, Connecticut.
6. "Causes and Cures of Common Welding Troubles," slides (12). Hobart Technical School, Troy, Ohio. Price: $1.25.
7. "Dynamic Careers Through Agriculture," 16mm film, 28 minutes. Farm Film Foundation, 1425 H Street, Northwest, Washington, D. C., 20005.
8. "Factors to Consider in Selecting Electrodes," Chart 35" x 28" Hobart Technical School, Troy, Ohio. Price: $1.25.
9. "Farm Tractor Maintenance," filmstrip set. University of Nebraska, Agricultural Education Department, College of Agriculture, Lincoln, Nebraska.
10. "Getting Along With Others," 16mm film, 29 minutes. Business Education Films, 5113 - 16th Avenue, Brooklyn, New York.
11. "Good and Bad Weld Plastic Replicas," set of 10. Hobart Technical School, Troy, Ohio. Price: $6.

12. "Learning Arc Welding Skills," Set of three filmstrips, 136 frames. Lincoln Electric Company, P. O. Box 3035, Cleveland, Ohio, 44117. Price: $5.00.

13. "Magic Wand of Industry," 16mm film, 25 minutes. Lincoln Electric Company, Cleveland, Ohio. Free.

14. "Quite Naturally," 16mm film. The Timken Roller Bearing Company, Canton 6, Ohio.

15. "Your Attitude is Showing," sound filmstrip, 12 minutes. Charles Shedman, Teacher-Trainer in Distributive Education, University of Pittsburg, Pittsburg, Pennsylvania.

16. Opaque Projector

17. Movie Projector

18. Combination filmstrip and slide projector

Suggested Tools and Equipment

No.	Items
1	Electric Impact Wrench
1	Wet Valve Refacer
1	Valve Seat Grinder inc. box
1	Valve Seat Cart
1	Armature Growler 120 volts A.C. 60 cycle
1	Grinder Sander
1	Floor Press Set (with accessories)
1	Electric Drill HD 1/2" Millers Falls
1	Electric Drill HD 3/4" Millers Falls
1	Bench Grinder 1 HP amp .13; 115v, 50/60 cycle rpm 1725, rec. wheel dia. 10" arbor dia. 3/4"
1	Electric Shears #16 for cutting 18 ga. and up
1	High Speed Hoist 2-ton
1	Ball Bearing Trolley 2-ton
2	Steel Storage Cabinet, swinging door style with lock (36" x 21" x 78")
1	File Cabinet 4-drawer legal
1	Pipe Threaders Set 1/8"-2"
1	Power Chisel Kit
1	Battery Tester
1	Battery Charger (5 yr. warranty, 6 & 12 volts, 100/50 amps silicone rectifier
1	Spark Plug Cleaner with 709 stand

No.	Items
1	Parts Cleaning Tank (25-50 gal., air agitated, sludge hose, lint filter, 2 shelves)
1	Exhaust Gas Analyzer
1	Welding & Cutting Outfit
1	Air Compressor (2 HP - 254 age motor 115/220V with 2-6269 belt guard, 60 gal. tank)
1	Electric Welder
1	1/3 HP Grinder: (includes eye shields and light, 2 standard wheels)
1	Service Jack
1	Engine Stand
1	Service Desk
1	Wheel Dolly
1	Snap Ring Plier Set
1	Valve Key Replacer
1	Valve Guide Cleaner
1	Carbon Scraper
1	Hose Clamp Pliers
1	Electrical Test Kit
1	Wheel Dressing Attachment (with diamond)
1	Carbon Arc Torch
1	Welding Cart
1	1 1/2 ton all purpose jack
1	Lathe Bit Kit
1	Steel Shelving Open
1	Shop Tool 30" ht
1	Welding helmet
2	Box type welding goggles
1	Tire tester tank
1	Mechanics creeper
1	Tire Bead Breaker
1	Tie Rod Separator
1	Tie Rod Separator
1	Comb. Tire Hammer
1	Grease & hub cap tool
1	Soft face hammer
1	Soft face hammer
1	Tubing cutter
1	Flaring tool
1	Kal Dwell-Tach Tester
1	Kal-Reg. Tester
1	Kal Atl-Reg Tester
1	Kal-Lite
1	Kal Remote Starter Switch
1	Kal-Start Circuit Tester
1	Kal-Pump Tester
1	Kal-Spark Tester

No.	Items
1	Stand for testers
1	Heavy-Duty Puller
1	Medium-Duty Puller
1	Slide-Hammer Puller
1	Light-Duty Puller
2	Reversible 3 1/2" Jaw
1	Yoke for 2 Jaws
1	Universal Wheel Puller
1	Striking Wrench
1	Bearing Separator
1	Step Plate Adapter Set
3	Step Plate Adapter
2	Narrow Jaws
1	Cap Screw Crossarm
1	Short Puller Rod
1	Single Puller Jaw
3	Reversible 4 5/8" Jaws
2	Pilot Bearing Jaw
1	Blind Bearing Puller
1	12-ton Hydraulic Ram
1	3-leg Yoke
1	2-leg Yoke
3	10" Jaw and Link
3	8" Jaw and Link
3	6" Jaw and Link
1	3-leg Yoke
1	SE91-0-8 Hand Shield
1	Oil Measure 1-quart
1	Oil Measure 2-quart
3	Drain Pans
1	Oily Waste Can 8.1 gal.
1	Water can (radiator filler)
1	Pressure Gun
1	Wheel bearing packer
1	Suction gun
1	Tractor funnel
1	Anti-freeze tester
2	25-ft. Trouble lights
2	Pour spout
1	Air Transformer
1	Air Dusting gun
1	Spray Gun
1	Suction feed cup and attach
1	Extra can and cover
1	25" rubber air hose
1	Cyl. Wall Deglazer (2-3")
1	Cyl. Wall Deglazer (2 3/4-3 7/8")

No.	Items
1	Cyl. Wall Deglazer (3 3/4-5 3/4")
1	Cyl. Wall Deglazer (5-7")
1	Ridge reamer (3-5")
1	Gas can
7	Adjustable wrench (click stop)
2	Vice grip wrenches (10" with cutter)
2	Vice grip welding clamps
2	Vice grip bending tools
2	General Fire extinguishers CO^2
2	Cutting tip
1	Heating tip
2	Welding tip
1	Exhaust Hose 6010' length
1	Tripod Projector screen 60" x 60" with white matte fabric model holiday projection table with extension cord and blanket
15	Tool Chest
15	Midget socket set 1/4"
15	Flex sockets 3/8"
15	Shallow Hex sockets
15	Deep Hex sockets
15	Speeders
15	Nut spinners
15	Plastic handles
15	Slide Bars
15	Ratchet Adapter
15	Ratchet
15	Square socket 1/4"
15	Square socket 5/16"
15	Square socket 3/8"
15	Ratchet spinner
15	Universal joint
15	Extensions 3"
15	Extensions 4"
15	Extensions 6"
15	Extensions 12"
15	Extensions 1"
15	Nut speeder
15	Nut spinner
15	Sliding Bar 12"
15	Extensions 3"
15	Extensions 5"
15	Extensions 10"
15	Universal Joint
15	Double Hex sockets
15	Heavy duty ratchet
15	Sliding Head
15	Ratchet Adaptor
15	Nut spinner head

No.	Items
15	Extension bar 3"
15	Extension bar 6"
15	Extension bar 12"
15	Heavy Duty sockets 15/16
15	Heavy Duty sockets 31/32
15	Heavy Duty sockets 1"
15	Heavy Duty sockets 1 1/16
15	Heavy Duty sockets 1 1/8
15	Heavy Duty sockets 1 3/16
15	Heavy Duty sockets 1 1/4
15	Heavy Duty sockets 1 5/16
15	Heavy Duty sockets 1 3/8
15	Heavy Duty sockets 1 7/16
15	Heavy Duty sockets 1 1/2
15	Heavy Duty sockets 1 9/16
15	Heavy Duty sockets 1 5/8
15	Heavy Duty sockets 1 11/16
15	Heavy Duty sockets 1 3/4
15	Heavy Duty sockets 1 13/16
15	Heavy Duty sockets 1 7/8
15	Heavy Duty sockets 2"
15	Box socket set (Box wrenches)
15	Box socket set (Box wrenches - dwarf)
15	Ignition wrench set
15	Combination wrench set (open and box)
15	Tappet wrench set
15	Screw Driver set (std. tip)
15	Screw Driver set (phillips tip)
15	Chisel and punch set
15	Screw Drivers (spark tester) 5 1/8"
15	Screw Starter (5 1/4" length)
15	Pry Bar (16")
15	Hack saw (10-12" blades)
15	Ratcheting box socket
15	Ball peen hammer (4 oz.)
15	Ball peen hammer (12 oz.)
15	Plastic hammer 1
15	Feeler gauge
15	Wire spark plug gauge
15	Carbon scraper
15	Wire brush
15	Valve lifter
15	Valve key replacer
15	Valve spring compressor
15	Ignition plier
15	Gripping plier (optionnal-47B)
1	Needle nose plier
1	Diagonal cutter

No.	Items
15	Battery plier
15	Point file
15	Spark plug socket
1	Torquemeter
1	Combination wrench 1 1/16
1	Combination wrench 1 1/8
1	Combination wrench 1 1/4
1	Combination wrench 1 5/16
1	Combination wrench 1 3/8
1	Combination wrench 1 7/16
1	Combination wrench 1 1/2
1	Combination wrench 1 5/8
1	Hex head wrench
1	Phillips offset screwdriver 6"
1	Phillips offset screwdriver 9"
2	Offset screw driver 12"
1	Stud remover
1	Extractor set
1	Ratcheting box socket
1	Tune-up kit
15	Long tapered punches 3/8" sq. stock point 3/16" length 8"
15	Long tapered punches 7/16" sq. stock point 1/4" length 8 1/2"
15	Long tapered punches 1/2" sq. stock point 5/16" length 9"
15	Long tapered punches 9/16" sq. stock point 3/8" length 9 1/2"
15	Long drift punch 7/32" dia. 4 1/2" length (overall length 8")
15	Long lining-up punch 9/16 sq. stock 5/32 point 9 3/16" (tapered 14" overall length)
1	Long flat chisel stock 3/4" edge 7/8" length 16"
1	Long flat chisel stock 7/8" edge 1" length 18"
15	Joint gripping plier 9 1/2" long
1	Valve spring compressor
1	Rim wrench 13/16"-3/4"-7/8" 15/16" 10" arm
1	Tire valve tool
1	Rim tool 19 1/8 W length end 9/16" and 5/8" for split rims and rimbrocks
1	Curved tire removing tool width 1 3/8" length 18"
1	Straight tire removing tool width 1 3/8" length 18"
1	Vinylite cover for refacer
1	Collet 1/4" to 3.8" stem capacity

No.	Items
1	Collet 1/2" to 11/16" stem capacity
1	Ball peen hammer 2 oz.
1	Brass hammer 1#
1	Flexible grip-it tool 15" long; 8" flexible section
1	Magnetic pick-up tool 6" long
1	Magnetic pick-up tool 9"
1	Magnetic pick-up tool 16 1/2"
1	Inspection mirror 16 1/2" long Mirror 1 11/16" x 2 9/16"
1	Piston ring compressors 2 bands capacity 2 1/8"-5 Ht 3 1/2"
1	Piston ring compressor 4 bands capacity 3"-7" Ht 6 1/2
1	Piston Ring compressor 1 band capacity 1 1/2"-3" Ht 2"
1	Tap and Die set 4-36 to 12-24
1	Tap and Die set 1/4 to 1/2
1	Tap and Die set 9/16 to 3/4
1	Tap and Die set 3/4 to 1"
2	Electric soldering gun
1	Heavy duty busing driver set
1	Battery cable puller
1	Small general puller
1	Booster cable set
1	Battery terminal spreader
1	Battery post and terminal brush
1	Battery service kit (complete)
1	Wheel puller
1	Wheel puller adaptor
1	Electric drill HD 1/4:
1	Electric drill bench stand for 3/4" drill
1	Drill grinding attachment 1/8" to 1/2" dia.
2	Floodlight eye shield 2-25 w. 115 v. rights for above grinder
1	Grinder pedestal for above grinder with coolant bucket
4	Bench vises 5" jaws
15	All purpose work bench 6' x 34' x 34"
1	Heavy duty adj. steel shelving for book storage, closed back and ends (37 3/8" x 12 5/16" x 86")
1	Pipe wrenches 6"
1	Pipe wrenches 8"
1	Pipe wrenches 10"
1	Pipe wrenches 12"
1	Pipe wrenches 14"
1	Pipe wrenches 18"

No.	Items
1	Ball peen hammer 8 oz.
1	Ball peen hammer 16
1	Ball peen hammer 20
1	Ball peen hammer 24
1	Ball peen hammer 32
1	Ball peen hammer 40
1	Ball peen hammer 48
1	Small pressure oilers 5-oz.
15	Pint size pressure oiler
15	Putty knives 2 1/2" blade scraper
15	Putty knives 4" blade scraper
8	Steel tape rules 10 ft.
1	Chipping hammer
1	Blacksmith hand hammer
1	Pexto tin snips 3" cut
1	Master torch and cylinder
1	Pipe cutter CPA 1/8"-2"
1	Pipe Vise cap. 1/8"-2"
1	Reamer pipe capacity 1/4"-2"
4	Micrometer 4"-1" by .001"
1	Rule depth gauge 0-5" with 6" rule and rod
1	Comb. set 12" blade
1	Outside calipers 6"
1	Inside micrometer 6 rods 2"-8" in case
1	Inside calipers 6"
1	U. S. Standard gauge #0-36
1	Gooseneck wrecking bar 1/4" x 24"
2	"C" clamps 6"
1	Bench drill vise cap. 3"
1	Porter bolt and wire cutter 36"-5/8"
1	Small engine tester Ing-coil
1	Dial indicator
1	Telescopic gauge set
1	Valve guide driver set
1	Ring expander tool
1	Hydraulic pressure gauge 0-10,000
20	Box type goggles
	Respirators
	5lb. spool wire solder
	1lb. soldering paste
24	Bulbs (25 watt-120 volt)
12	Bulbs (75 watt, rough service)
4 doz.	2-10 3/4 x 13" friction tape
2 doz.	#123 3/4 x 20' electrical tape
1 roll	1/4 x 60 yds. Masking tape
1 roll	1/2 x 60 yds. Masking tape
1 roll	3/4 x 60 yds. Masking tape
1 roll	1" x 60 yds. Masking tape
1 roll	2" x 60 yds. Masking tape

No.		Items
12	pts	3D Permatex aviation gasket cement
12	tubes	1c Permatex #1 formgasket
1		Solderless terminal kits
12		Parts cleaning brushes
10		Cartridges lubriplate all purpose grease
10		Cartridges molith #2 lubriplate moly-grease
1		Bolt Asst., includes cap screws, cotter pins, metal screws, machine screws, and cabinet
1		Grease fitting assortment
6	tubes	#348 Permatex valve grinding comp.
1		Wire cup brush 4" dis.
1		Wire cup brush 6" dis.
56		Wood file handles for 6-8" files Link Long Ferruled #2
28		Wood file handles for 8-10" files Link Long Ferruled #3
63		Wood file handles for 10-12" files Link Long Ferruled #4
6	pr.	Welding gloves
3		Cylinders replacement
15		File Card and brush
25	lb.	Arc Rod 3/32" welding
50	lb.	Arc Rod 1/8" welding
100	lb.	Arc Rod 5/32 welding
10	lb.	1/16" Bronze Rod Welding
10	lb.	1/8" Bronze Rod Welding
1	doz.	Bench dusters
30		Hack saw blades
1		60 grit refacing wheel
15		Sets Mill file double cut (flat) 6"-8"-10" with kit bag
15		Sets Mill file double cut (half round) 6"-8"-12" with kit bag
15		Sets Mill file double cut (round) 6"-8"-10"-12" with kit bag
1		Ring groove cleaning wool
1		Carbon brush 1/4" stem, std.
1		Carbon brush 1/4" stem, spiral twist
1		Carbon brush 1/4" stem, cut type
2		Sets high speed drills by 1/16" - 1/2" (29)
1		High speed drill 1/2" shank
7		High speed drill 1/2" shank
2		Sanding Disc Pad 7", use on ES-71A sander

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46. Linde, The Oxy-Acetylene Handbook. New York: 270 Park Avenue, Union Carbide Corporation, Linde Division. Price: $3.

47. Long, Kenneth F. Small Engines Service Manual, Sixth Edition. Kansas City 5, Missouri: 1014 Wyandotte Street, Technical Publications. Price: $4.95.

48. McLarney, William J. Management Training, Cases and Principles. Homewood, Illinois: Richard D. Irwin, Inc., 1959.

49. Management Course in Dealer Service Operations. Indianapolis, Indiana: Massey-Ferguson Training Center.

50. Mechanics Study Guide -- Transmission Theory. Racine, Wisconsin: Industrial Service Building, J. I. Case Company.

51. Modern Arc Welding Procedures and Practices, (EW-200). Troy, Ohio: Hobart Technical School. Price: $3.50.

52. New Departure Ball Bearings for Farm Implements. Bristol, Connecticut: Division of General Motors Corporation

53. Parts Manual, may be available from manufacturers.

54. Parts Purchasing Control Procedure. Chicago, Illinois: 3525 West Peterson Road, Massey-Ferguson Company

55. Parts Sales Manual. Moline, Illinois: John Deere, Inc.

56. Perfect Circle Service Manual. Hagerstown, Indiana: Perfect Circle Corporation, 1963. Price: $1.50.

57. Phipps, Cook, Scranton, and McCalley. Farm Mechanics Text and Handbook. Danville, Illinois: Interstate Publishers, Inc., 1959.

58. Phipps, Lloyd J. Your Opportunities in Vocational Agriculture. Danville, Illinois: The Interstate Printers and Publishers, 1962. Price: $3.25.

59. Piston Rings, Pistons, and Cylinders, Form 2013. Hagerstown, Indiana: Perfect Circle Corporation, 1963. No charge.

60. Promersberger, William J.; Bishop, Frank E. Modern Farm Power. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962.

61. Purvis, Jud. All About Small Gas Engines. Homewood, Illinois: 18050 Harwood Avenue, Goodheart-Wilcox Company, 1963. Price: $3.38.

62. Richert, G. H.; Meyer, W. G.; and Haines, P. G. Retailing Principles and Practices, Fourth Edition. New York: Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1962.

63. Ridenour, H. E. Combines and Combining. Columbus, Ohio: 2120 Fyffe Road, Department of Agricultural Education, The Ohio State University, Agricultural Administration Building, 1965. Price: $.75.

64. Robinson, Blackler, and Logan. Store Salesmanship, Fifth Edition. Englewood Cliffs, New Jersey: Prentice Hall, 1959.

65. Rowse and Nolan. Fundamentals of Advertising. Cincinnati, Ohio: Southwestern Publishing Company, 1957.

66. Seals, Separators, Lubricants. Bristol, Connecticut: New Departure, Division of General Motors Corporation.

67. Serif, Ned (ed.) How to Manage Yourself, Volume 1. New York: 60 Wall Street, Cities Service Oil Company, Business Research and Education Division, (paperback), 1961.

68. Service Center Management. Chicago, Illinois: 180 North Michigan Avenue, International Harvester Company.

69. Service Procedure for Ball Bearings. Bristol, Connecticut: New Departure, Division of General Motors Corporation.

70. Sferro, Wright, and Rice. Personality and Human Relations, Second Edition, Text-workbook. Hightstown, New Jersey: Gregg Publishing Division, McGraw-Hill Book Company. Price: $3.95.

71. Shop Manual for Timken Roller Bearings. Canton 6, Ohio: Timken Roller Bearing Company, 1952.

72. Smith, Harris, and Pearson. Farm Machinery and Equipment. New York: McGraw-Hill Book Company, 1964. Price: $10.50.

73. Smith, N. P. Farm Machinery and Equipment. Fifth Edition. New York: McGraw-Hill Book Company, 1964. Price: $10.50.

74. Smith's Short Course for Gas Cutting, Welding, Brazing (form 242). Minneapolis, Minnesota: 27th Avenue and 4th Street, S. E., Educational Department of Smith Welding Equipment, Division of Tescom Corporation. Free.

75. Stone, A. A. and Gulvin, H. E. Machines for Power Farming. New York: John Wiley and Sons, Inc., 1957. Price: $5.95.

76. The AVC of Internal Combustion. General Motors Corporation.

77. There's a Future in Your Farm Background. New York: 630 Third Avenue, The National Sales Executives, Inc., 1958.

78. Tractor Maintenance and Tune-up. Chicago 1, Illinois: 180 N. Michigan Avenue, International Harvester Company, 1962. Price: $1.50.

79. Transmission Theory. Racine, Wisconsin: J. I. Case Company.

80. Wakeman, T. F. and McCoy, V. L. The Farm Shop. New York: The MacMillan Company, 1960.

81. Walker R. W.; Stevens, G. Z.; and Hoover, N. K. "Pennsylvania Vocational Agriculture Interest Inventory." Danville, Illinois: Interstate Printers and Publishers. Specimen Set price: $1.

82. Weyant, J. Thomas; Hoover, Norman K.; and McClay, David R. An Introduction to Agricultural Business and Industry. Danville, Illinois: Interstate Printers and Publishers, 1965. A student's text of approximately 200 pages and a teacher's guide.

83. Wilson, Howard. Living With Yourself. Deerfield, Illinois: Box 3, Administrative Research Associates (paperback), 1962. Approximate Price: $1.

84. Wilson, Howard. Understanding People. Deerfield, Illinois: Box 3, Administrative Research Associates (paperback), 1962. Approximate Price: $1.

85. Wilson. L. W. Farm and Power Equipment Retailers Handbook. St. Louis, Missouri: 2340 Hampton Avenue, National Farm and Power Equipment Dealers Association, 1964. Price: $8.

86. Wingate and Nolan. Fundamentals of Selling, Seventh Edition. Cincinnati, Ohio: Southwestern Publishing Company, 1959.

87. Wingate and Weiner. Retail Merchandising. Cincinnati, Ohio: Southwestern Publishing Company, 1957.

68. Operator's and shop service manuals from the major-line agricultural machinery manufacturer at the address given below:

a. Service Department
Tractor and Implement
Ford Motor Company
2500 E. Maple Road
Birmingham, Michigan

b. J. I. Case Company
Racine, Wisconsin

c. International Harvester Company
180 N. Michigan Avenue
Chicago, Illinois

d. Oliver Corporation
400 W. Madison
Chicago, Illinois

e. Allis-Chalmers Corp.
Milwaukee, Wisconsin

f. Massey-Ferguson, Inc.
Indianapolis Training Center
6143 Brookville Road
Indianapolis, Indiana

g. Deere and Company
Moline, Illinois

h. Service Department
Minneapolis-Moline
Hopkins, Minnesota

THE CENTER FOR RESEARCH AND LEADERSHIP DEVELOPMENT
IN VOCATIONAL AND TECHNICAL EDUCATION
THE OHIO STATE UNIVERSITY
980 KINNEAR ROAD
COLUMBUS, OHIO, 43212

INSTRUCTOR NOTE: As soon as you have completed teaching each module, please record your reaction on this form and return to the above address.

1. Instructor's Name_____

2. Name of school_____State_____

3. Course outline used: _____Agriculture Supply--Sales and Service Occupations
   _____Ornamental Horticulture--Service Occupations
   _____Agricultural Machinery--Service Occupations

4. Name of module evaluated in this report_____

5. To what group (age and/or class description) was this material presented?____
   _____

6. How many students:
   a) Were enrolled in class (total) _____
   b) Participated in studying this module _____
   c) Participated in a related occupational work experience program while you taught this module _____

7. Actual time spent teaching module:

		Recommended time if you were to teach the module again:
_____hours	Classroom Instruction	_____hours
_____hours	Laboratory Experience	_____hours
_____hours	Occupational Experience (Average time for each student participating)	_____hours
_____hours	Total time	_____hours

(RESPOND TO THE FOLLOWING STATEMENTS WITH A CHECK (✓) ALONG THE LINE TO INDICATE YOUR BEST ESTIMATE.)

	VERY APPROPRIATE	NOT APPROPRIATE
8. The suggested time allotments given with this module were:		
9. The suggestions for introducing this module were:		
10. The suggested competencies to be developed were:		
11. For your particular class situation, the level of subject matter content was:		
12. The Suggested Teaching-Learning Activities were:		
13. The Suggested Instructional Materials and References were:		
14. The Suggested Occupational Experiences were:		

(OVER)

15. Was the subject matter content sufficiently detailed to enable you to develop the desired degree of competency in the student? Yes_____No_____
Comments:

16. Was the subject matter content directly related to the type of occupational experience the student received? Yes_____No_____
Comments:

17. List any subject matter items which should be added or deleted:

18. List any additional instructional materials and references which you used or think appropriate:

19. List any additional Teaching-Learning Activities which you feel were particularly successful:

20. List any additional Occupational Work Experiences you used or feel appropriate:

21. What do you see as the major strength of this module?

22. What do you see as the major weakness of this module?

23. Other comments concerning this module:

_____ _____
(Date) (Instructor's Signature)

_____
(School Address)